

Barcodes in Education: On the Straight and Narrow



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Student success and educational efficiency aren't always straightforward. [Multiple factors](#) contribute to pupils' potential over the long term, while schools are increasingly tasked to do more with less and find efficiencies in existing processes. In the first part of our Barcodes in Education eGuides series, we'll break down the impact of pre-barcode challenges in the classroom, how current scanning solutions can improve school processes, and what challenges remain in applying the straight and narrow advantages of barcodes at scale.

IN THIS EGUIDE, WE WILL EXPLORE:

- > A Brief History of Barcodes
- > Leveraging Barcodes in Education
- > The Paper Problem
- > Barcode Barriers

A Brief History of Barcodes

Today, barcodes are ubiquitous, and with good reason. From universal product codes (UPCs) to mobile QR codes, the benefits of this technology are black-and-white. They streamline both identification and management, making it easier for organizations to keep track of what resources they have and where to find them.

Less than fifty years ago, however, barcodes were just beginning. As noted by [Smithsonian Magazine](#), the familiar rectangular code featuring wide and narrow lines wasn't adopted until March 30th, 1973, and didn't permeate public consciousness until the 1980s thanks to widespread retail adoption. Even this barcode — designed by George Laurer of IBM — owed its creation to an earlier version developed by Joe Woodland in 1949.

While sitting on the beach thinking about Morse Code, Woodland drew four lines in the sand and realized that line thickness could stand-in for Morse dots and dashes, making it possible to convey information optically. Practical application of his idea required both the development of laser-based scanners in the 1960s and the ability to print codes small enough — yet still legible — that could fit on a package of gum. In 1973, invention and infrastructure aligned and the barcode as we know it was born.

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The Paper Problem

Paperwork is a problem. Physical documents are easy to lose, costing schools time and money as they reprint and recomplete critical forms. Storage is an extra complication when it comes to physical documents. Filing cabinets take up valuable space and finding specific documents can take hours or days. This is especially problematic when it comes to evolving student data privacy laws requiring schools to deploy auditable, accessible storage solutions in case of compliance audits or data requests.

In Texas, for example, the [Paperwork Reduction Act](#) aims to “limit redundant requests and the number

and length of written reports that a classroom teacher is required to prepare,” while [other school districts](#) are using high-speed scanners to digitize student records.

[Recent research](#) shows the impact of manual, paper-based processes on taking attendance. Students report difficulty hearing the teaching during roll call, while teachers say that compiling attendance reports is tedious and time consuming. [Another study](#) found direct correlation between student attendance and school success, highlighting the need for accurate and efficient data capture.

Leveraging Barcodes in Education

Barcodes offer a way to bridge this gap. By assigning codes to student identification cards or physical resources such as textbooks or laptops, schools can more easily collect, store, and leverage data. Current applications include:



RESOURCE BORROWING

Schools such as McMaster University use barcoded student IDs as [library cards](#), making it easier for students to borrow what they need and school administrators to track key materials. As noted by [Technology Advice](#), this allows educational institutions to “attribute a unique machine-readable system of identification to each education asset.”



MEAL CARDS

At Simon Fraser University, [meal card balances](#) are tied to student ID cards. Each time the barcode is scanned by participating on or off-campus food vendors, the existing balance is automatically debited. Students can reload their cards at campus Dining Services using cash, debit, credit cards, certified checks, or money orders.



ATTENDANCE TRACKING

At Eastern Michigan University, QR codes attached to student ID cards [tracked the attendance](#) of student-athletes at after-school study programs. The university found that when students spent three hours per week (or more) at these “Study Table” sessions, the common result was an increased GPA.



STUDENT AUTHENTICATION

[Charles County Public Schools](#) (CCPS) now uses student ID badges that include name, school of attendance, class grade, school year, and a barcode. Using an iPad connected to the school’s student tracking system, CCPS can ensure students are where they’re supposed to be, when they’re supposed to be there.



PUBLIC TRANSIT

In Fort Collins, Colorado, a new partnership between Colorado State University (CSU) and transit agency Transfort allows students to use their CSU ID cards to [pay for transit fares](#) using a “tap-and-ride” system.

Barcode Barriers

Despite the [expanding impact of barcodes](#) for educational institutions, potential barriers remain, such as:



PHYSICAL DAMAGE

Student ID cards typically remain with students at all times. The continual use and storage of cards — in wallets, phone cases, or pockets — can cause damage to all or part of the barcode. For example, specific lines may start to rub off or the entire code may begin to fade, making it difficult for scanners to recognize the barcode. While reprinting and reissuing cards to students helps limit the impact of damaged cards, schools also need barcode-reading technology capable of identifying codes even if some physical data is absent, especially during high-value events such as exams or critical operations such as lockdown drills.



PRINTING ERRORS

While physical printing technologies have improved significantly over the past five years, errors such as offset barcodes or misalignment can still occur, especially if staff aren't familiar with new printing processes. In this case, students may not realize that their card isn't working as intended until they're unable to purchase a meal, access public transit or borrow library resources. Here, it's critical for schools to employ advanced tools that can extrapolate critical barcode data even if printing errors occur.



DATA INTEGRATION

Scanning barcodes for attendance or authentication is the entry-level benefit of code equipped IDs, but to meet the emerging demands of data-driven educational outcomes, schools need ways to integrate scanned information with larger databases to empower analytics at scale. With the right permissions and tools in place, for example, it's possible for schools to assess current resource use trends and better predict future procurement needs. Barcodes are helping schools get on the straight and narrow path to digital improvement, but problems persist.





Ready to learn more about overcoming ID issues and empowering digital outcomes? Check out part two of our [Barcodes in Education eGuide series, Reading Comprehension.](#)

